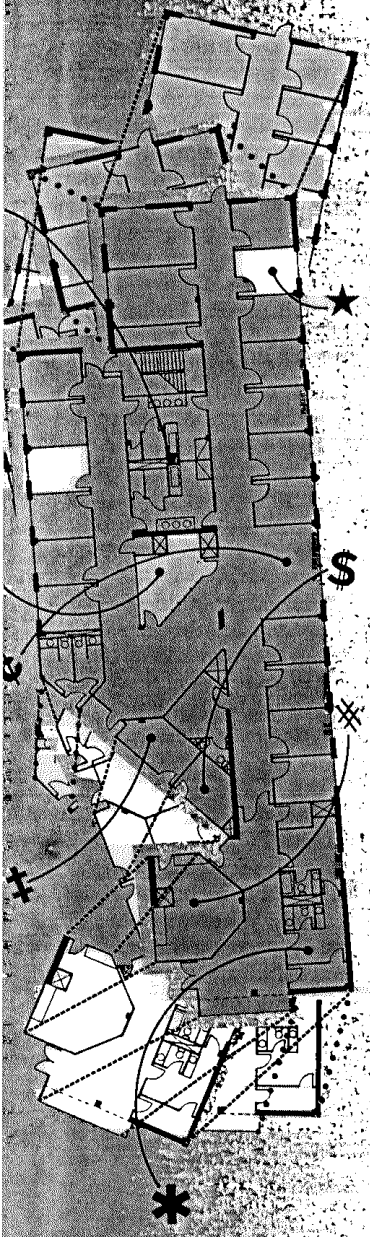
benefits of evaluating completed buildings.
Specifications: Walter Rosenfeld discusses the problem of product substitutions.



POE: Building on 20-20 Hindsight

Shortly after a new California prison opened, the warden requested $3.2 million in change orders to make the kitchen functional. But before authorizing this expenditure, the California Department of Corrections and Kitchen Capital Expenditure Managers, working with one of the authors (Zimring), performed a Post-Occupancy Evaluation (POE) of the facility. Rather than faulting the architects, they discovered that there were some problems with specifications of food equipment—food carts were hard to get through the doors—and that the prison staff did not know how to operate the innovative cook-chill equipment. Based on the results of the study, the corrections department was able to reduce the change orders to $800,000—a $2.4 million saving from a single study. The POE also resulted in rewritten guidelines for planning, operation, and development of a prototypical kitchen design and equipment list for future prisons. The prison staff was enthusiastic that they had a role in developing the solution.

The Stubbins Associates (TSA) had a two-phase commission from a major engineering firm to design two 500-person research buildings. The client was interested in using open office landscaping in their new buildings even though their existing buildings contained enclosed offices. TSA persuaded the company to explore this change by building and staffing a 30-person prototype in a nearby office building. TSA performed a POE of the prototype facility and found serious complaints about lack of privacy and difficulties maintaining the high security levels needed for classified research. As a result of the POE, it was decided to use enclosed offices in the new buildings.

TSA also performed a POE several months after the first phase of the building was oc-

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Specifications: Specbusters

In preparing project specifications, it is only realistic to recognize that as soon as the documents leave the office and make their way into the construction world, they will probably be attacked, and, if possible, subverted or circumvented. The same competitive forces that invigorate our economy make the selection of contractors and products a battlefield of sorts that must be traversed very carefully by the architect who is trying to control a project.

While these forces are also at work during initial product selection, the architect and specifier are usually able to handle this phase more easily because the players are fewer and their ultimate authority is more obvious. By doing the necessary research and investigation of products before deciding, by naming at least three acceptable products for each use, and by working with manufacturers' representatives during the documentation period, the specifier can establish a sound basis for such decisions and a strong position from which to defend these choices.

A strong position is also generally needed to fend off subsequent attempts to change or vary what the documents require. Persistence and ingenuity (valued characteristics in salespeople) are regularly applied to affect product purchases in favor of the aggressive manufacturer or distributor. And for contractors, saving money often means making money, an effort that seldom ceases. While the architect's responsibility is to the work, others are actively pursuing a better bottom line in their own interests. Breaking the project specifications is often the means or the result.

Foremost among the methods used is the straight-out cost attack. There is almost always a product that can be bought or installed more cheaply than the one specified. Seldom will the

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Practice Points

***The U.S. Supreme Court* has supported the authority of architects to determine what constitutes "or equal" in specifications. The court declined to consider an appeal of *Whitten v. Paddock*, a case in which a lower court had ruled that contractors could not decide which suppliers qualify as "or equal."**

***Elementary schools* continue to be a booming market for architects, said Dr. Stuart Rose at the AIA convention. Los Angeles County, for example, gets 3000 new students every month. Complicating the situation is the fact that few architects have had much experience designing schools during the past 20 slow years.**

***Lump-sum fees* are used by architects more often than any other billing method, according to a survey by *Professional Services Management Journal*. Forty-three percent of firms use lump sum fees; 22 percent use a percentage of construction cost.**

***Restroom facilities* are not usually provided to both sexes according to need, says the Washington State Department of Transportation. Their study indicated that women spend 75 percent more time per use in restrooms than men, and recommends a 60–40 female-to-male toilet fixture ratio, instead of an even split.**

***An interlocking relationship* between the design/build partners and the supervising architect of the ill-fated L'Ambiance Plaza in Bridgeport, Conn., was criticized by the state's Department of Public Safety, which said that an independent supervising architect, whose presence on the job was required by a state finance authority, was in fact a subcontractor for the architects of record.**

POE *(continued from page 55)*
cupied. They found that columns in the secretarial area limited the number of work stations that could be placed there. Although the engineering firm had originally intended simply to use the same plans from Phase I for Phase II, the POE convinced TSA to move the columns, reorient the offices to make them more energy efficient, and make numerous other small improvements. The POEs of the prototype and the Phase I building saved several million dollars in energy and renovation costs and helped lead to four additional major commissions for TSA from the engineering firm.

Although success stories such as these are becoming more common, relatively few architecture firms have embraced POE. Most activity is by large building clients such as IBM, Westinghouse, U.S. Postal Service, Health and Welfare Canada, California Department of Corrections, and others who have incorporated POE into their building procurement and management process. POE now affects billions of dollars of construction annually.

Architects have been put off by the arcane, scientific mystique and jargon that have surrounded POE, and by the difficulty in funding POEs. Recently, however, evaluators have gotten cannier about producing action-oriented studies that address clients' and architects' needs, that are clearly and graphically presented, and that can be accomplished within modest budgets.

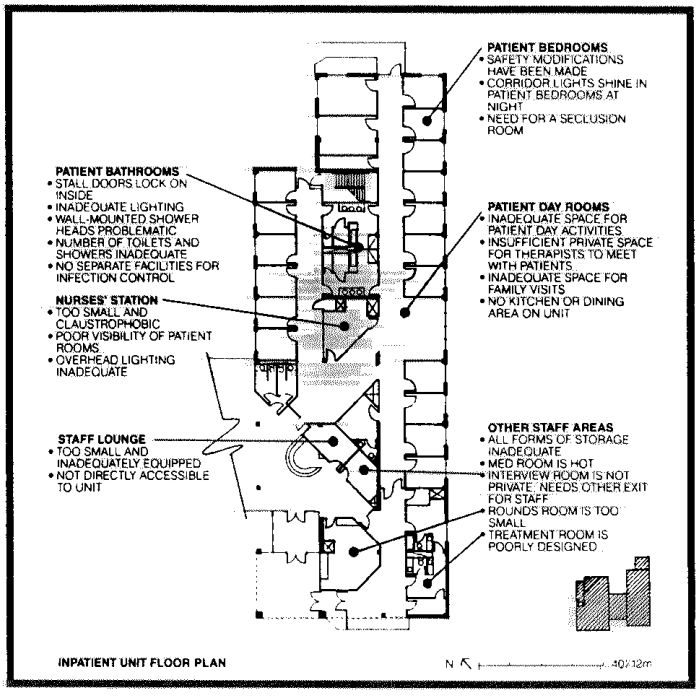
POE Benefits and Pitfalls

POE can be an effective way for architectural firms to achieve such important goals as extending their relationship with the client after the project is completed, getting feedback from past projects to increase office expertise, and addressing potential shortcomings in buildings before they become serious problems. POEs also help in gathering specific information and, perhaps more important, serve as the basis of discussion with the client and within firms about goals, strategic plans, and design methods. Firms that do POE on a regular basis have found that:

POEs improve client relations. Firms such as Kaplan/McLaughlin/Diaz of San Francisco, The Stubbins Associates of Cambridge, Massachusetts, CRSS of Houston, and Brooks & Associates of Tucson often perform a study of a project after completion, at their own expense, as a value-added service. They have found that POEs provide an opportunity to demonstrate a long-term commitment to the project and to talk to the client after the formal contract period has ended. These POEs typically include interviews with senior administrators in the client organization, interviews with some typical occupants, walk-through observations by architects or consultants, and sometimes formal questionnaires distributed to department heads or representative occupants.

The POE has resulted in clients requesting additional architectural services—often interior space-planning—to accommodate organizational anomalies discovered during the POE. Most of these firms say they emphasize POE in their marketing because it reflects a continuing interest in the client.

As in the California prison example, many of the client's concerns discovered in a POE can be easily corrected because they can often be traced to improper installation or reflect misunderstandings about how to use the building. This type of fine tuning is particularly important to a firm's reputation because clients may become focused on an unbalanced HVAC system rather than their general satisfaction with the building. In addition, most architects want to know whether the building met the client's needs before listing that client as a reference for future work.



POEs head off later problems. Some architects worry that a POE might expose flaws in the building that the client had not otherwise seen. This is a valid concern. One POE by an architecture firm discovered unrecognized major problems in installation of the HVAC system that led to litigation against the mechanical contractor. However, architects who do POEs argue that the client would eventually discover serious problems. They find that POE provides an opportunity to deal with shortcomings in a positive manner before they become serious. Often the client remembers the attempt to correct difficulties more than the original problem. Architect/attorney Gerald Gameil Weisbach, a partner in Natkin & Weisbach, San Francisco, observes that POEs allow architects to express a continuing interest in a building that is important in establishing a good relationship with the clients. "Your friends never sue you," says Weisbach.

Weisbach notes, however, that the evaluator who is performing under contract has potential liability exposure if he or she does not discover a problem with the building that causes the client harm later. Weisbach recommends that if the standard AIA special or designated services forms are used, a very explicit scope of services should be attached for the POE (and should be equally explicit about the issues, systems, or areas of the building that *will not* be included), since unlike architectural design, POEs have no history of practice to establish a standard of care. This is useful advice given the inexperience of most clients with POE.

POEs provide information useful on subsequent projects. Herbert McLaughlin, a partner in Kaplan/McLaughlin/Diaz, evaluated a private psychiatric hospital in Marin County as preparation for designing a new hospital for the same client. He discovered that unlike the patients he was familiar with, the patients in the private hospitals spent their day walking around: Sometimes they circled widely, avoiding all social contact; other times they would walk by the edge of activities and observe; occasionally they would walk right through and participate. This concept of a choice of routes and a progression of levels of involvement became the basis for the firm's design of the subsequent facility and helped provide the concept for two other acclaimed projects: an office building and a jail.

POEs can also help refine standard details and design vocabulary that may be repeated in other projects. POE is particularly well suited to refining features over time. As architect Michael Kraus says, "Developers of spec office buildings are most interested in lobbies, elevators and bathrooms." POE can have a role in fine-tuning these features and in understanding when custom design is necessary.

Doing POEs

The action orientation to many current POEs is a departure from the social-science approach that has been employed for two decades. Whereas most POEs had focused on the interests of the evaluators, action-oriented POEs address the needs and perspectives of decision-makers. Earlier POEs primarily addressed whether the final building has met the original programmatic objectives; action-oriented POEs also examine how objectives and organizational goals have changed. This helps the architect and client reflect on whether administrative policies need to respond to altered realities. This more dynamic model of POE is in many ways similar to architectural practice where clear communication with the client is critical and where criteria and goals never seem to stand still.

How to fund a POE. Whereas some POEs are internally funded by architecture firms, the growing acceptance by large building clients suggests a poten-

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POE *(continued from page 56)*
tial market for promoting POE services to clients. Clients who pay for POEs often have several things in common: They are developing a series of buildings and see the value of refining the product; they are facing considerable uncertainty, where the rules are changing and they cannot rely on past experience or conventional wisdom; and they are in an organization open to information.

For instance, the California Department of Corrections (CDC) has begun one of the largest public construction programs in the world. After not building new prisons for over 50 years, they are spending $4 billion to more than double the capacity of the state's prisons. It was not difficult to sell them an ongoing POE program to test prison designs and prison components because they see their design process as one of refining prototypes.

Who will use the information and how? POE is a useful part of a broader strategy to gather information that can be of help to all steps of the building process: planning, pro forma analysis, programming, design, construction supervision, and management. The evaluator therefore needs to consider who makes decisions of various kinds and how decision-makers are accustomed to receiving information. Detailed information about the efficiency of area per bed may interest a hospital program planner, but the administrator may be more concerned about cost-effective ways of improving the wayfinding system.

The action-oriented evaluator begins the POE by temporarily setting aside his or her preconceptions and listening to the clients' needs. Key issues include clarification of their background and formal and informal responsibilities, what past reports or studies they have found useful (and why), any past positive or negative experience they have had with evaluation, and the specific uses to which the POE information will be put.

What kinds of information (and how much) do decision-makers need? Many early POEs were like shooting in the dark; sometimes you hit the target but you used a lot of ammunition. In order to satisfy the often tight budget constraints of action-oriented POEs, evaluators are questioning carefully what is needed to meet the client's requirements. The question is how little information can you collect and what methods are most appropriate. A brief walk-through by experts and representative interviews may be sufficient to evaluate one place. When the intention of the study is to generalize to other settings, times, or user groups, then methods such as questionnaires or standardized observation schemes that allow more control and comparability are appropriate.

How can information be gathered with minimum time and money? Many people assume that handing out questionnaires to building users is the most efficient way for an evaluator to get a lot of information in a short amount of time. While it may require relatively little effort to administer, a comprehensive questionnaire is very costly to develop and time-consuming to analyze. Many POEs can be conducted with less formal techniques, utilizing resources within the client organization or architecture firm. Information is being gathered by organizations all the time anyway and that presents opportunities to piggyback evaluation needs. Staff in institutional settings such as hospitals or prisons, for example, conduct many routine checks of clients and facilities and are often willing to record information when provided simple checklists.

Organizational archives are another source of information. Jim Wise, an environmental psychologist, used film from security cameras to evaluate which bank designs were most prone to bank robberies (see P/A, Jan. 1986, pp. 138–139). In organizations that complain of too little meeting space, a review of conference room reservation logs often reveals patterns that yield solutions less costly than constructing more meeting rooms.

Perhaps the greatest impediment to broader acceptance of POE among architects has been the assumption that they must have specially trained staff to do an evaluation. While some aspects of POEs, such as questionnaire writing, do require specific training, most architects can develop good interviewing and observation skills by refining the communication skills they use in everyday practice.

Some techniques are deliberately low-tech to allow broad participation. The touring interview developed by Robert Shibley, a partner in the Caucus Partnership (Buffalo) and his colleagues at Victoria University
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POE *(continued from page 58)*
in New Zealand has been used in many action-oriented POEs. In the touring interview, small groups of building users are walked through portions of the building they are familiar with and are asked open-ended questions such as: "What goes on here? What works or doesn't work?" These responses are used to stimulate discussion in a follow-up small group meeting that can be used to clarify the users' responses and generate suggestions for the building or future buildings.

Also, knowing when to use other people as resources can be critical to efficient POE development. Expert consultants may be very useful, for example, in a half-day building walkthrough to identify critical issues. Public Works Canada has used teams of specialists, composed of architects, engineers, psychologists, and scientists, to walk through a building and provide a preliminary analysis of how well the building performs that then becomes the basis for future investigation. Interaction among the team often stimulates discussion of issues that might have escaped the notice of a single consultant.

Health and Welfare Canada, with the Boston consulting firm Building Diagnostics, Inc., trained facilities managers in hospitals to be the manpower for conducting POEs. An important side effect of this is interesting the staff in its implementation.

How can evaluation results be presented so they are interesting and useful? Many early POEs were difficult to read because they had been written in the traditional style and format of academic papers. Findings that are going to result in action must be easy for decision-makers to absorb at a glance. In a POE of a community mental health center for the Massachusetts Division of Capital Planning and Operations, the consulting firm of Welch & Epp Associates used annotated floor plans and histograms to make the results of their studies interesting and persuasive to future mental health policy-makers as well as to the health center's on-site facility management staff.

The likelihood of findings being implemented can be increased by such techniques as publishing the findings in the organization's newsletter or creating wall posters. When evaluations point to administrative as well as environmental changes, the findings might be presented in staff training sessions. Some architecture firms use lunch meetings for in-house training as an opportunity to discuss what was discovered in a particular building and what implications it has for the firm's future design work.

As POE has been increasingly utilized by architectural firms, its emphasis has become more practical and action oriented. Whether a firm uses the results to overtly market its success and concern for clients or for in-house education of its staff, POEs acknowledge the importance of accountability between client and building user.

Craig Zimring, Polly Welch ■

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Specifications *(cont. from page 55)*
owner be offered full credit for such cost reduction. Often the product proposed is not of appropriate quality. Always the architect must balance cost and quality, protecting the owner, the project, and his or her professional responsibility (read "liability") in the process. Clearly there are legitimate and appropriate cost reductions to be made somewhere on almost every project. However, substitution proposals need to be received cautiously, inquiries made conscientiously, and cost-benefit analyzed carefully before the architect assumes responsibility for the new product.

Unfortunately, the construction period is not the best time to be considering substitutions. The team that put together the drawings and specifications has usually been diminished if not disbanded. There are many other pressing practical and administrative matters requiring the architect's attention. It is not easy to assess quickly all the implications of changes. Time is one of the contractor's leverage points: "We can't get what you specified in time, so if you insist on it instead of accepting this substitution, you will be holding up the work." Requests for this type of change usually come late so that the architect is being asked to bail out the hapless (?)

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